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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/848,921	05/19/2004	Kwang-Soon Kim	3364P168	5850

8791 7590 09/05/2008
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER	
LAM, KENNETH T	
ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
09/05/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/848,921	KIM ET AL.	
	Examiner	**Art Unit**	
	KENNETH LAM	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1. The request filed on 6/23/2008 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. xxx is acceptable and a RCE has been established. An action on the RCE follows.

Response to Arguments

2. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (Walton herein after) (US 2003/0125040 A1) in view of Kong et al. (Kong herein after) (US 2003/0128674 A1).

Re Claim 1, Walton discloses an adaptive transmitter in a wireless communication system using frequency division duplexing (Background, [0004]), comprising:

a modulation and encoding method ([0011]) and transmit power determining unit ([0013]) for determining an antenna method ([0006]), a modulation and encoding method, and a corresponding transmit power according to parameters (received log likelihood ratio parameters) fed back from a receiver, the parameters including a mean and a normalized standard deviation of SNRs calculated by the receiver (a receiver processes received signal and provides channel state information then transmits the feedback signal to the transmitter [0080], [0148], SNR of the transmission and noise variance (standard deviation is equal to square root of variance) [0180]-[0187]), and deriving and reporting full or partial CSI [0302])-[0538]); and

an encoder and modulator for adaptively transmitting the traffic data to the receiver according to the antenna method, the modulation and encoding method, and the transmit power determined by the modulation and encoding method and transmit power determining unit ([0014]). Walton discloses the claimed invention except explicitly teaches wherein the transmit power is determined based on a transmit power

determined according to the mean of the SNRs and an increasing transmit power determined according to the normalized standard deviation of the SNRs.

However, Kong teaches a channel transmission device wherein the transmit power is determined based on a transmit power determined according to the mean of the SNRs and an increasing transmit power determined according to the normalized standard deviation of the SNRs ([0150]-[0154]). Therefore, it would have been obvious to one skilled in the arts at the time the invention was made to utilize the transmit power determination as taught by Kong with the adaptive transmitter as taught by Walton to achieve the same expected result and to further improve the signal transmission quality.

Re Claim 2, the combined teachings disclose the adaptive transmitter of claim 1, Walton further discloses wherein the modulation and encoding method and transmit power determining unit comprises:

a per-modulation-encoding-method target mean received SNR (i.e., signal to noise ratio) table for predefining target mean received SNR per modulation encoding method ([0076]);

a transmit power increase table for establishing per-modulation-encoding-method compensated power values that correspond to the received log likelihood ratio parameters fed back from the receiver ([0093]);

a transmit power determining unit (Figure 3B) for using the compensated power value output from the per-modulation-encoding-method target mean received SNR table

and the compensated power value output from the transmit power increase table according to the received log likelihood ratio parameters and determining compensated power values of the corresponding antenna method, the modulation method, and the encoding method ([0105]); and

an antenna/modulation/encoding method determining unit for determining the antenna method and the modulation and encoding method corresponding to the compensated power values determined by the transmit power determining unit, and outputting them to the encoder and modulator ([0104]).

Re Claim 3, the combined teachings disclose the adaptive transmitter of claim 1, Walton further teaches wherein the received log likelihood ratio parameters ([0167]) include the mean and the normalized standard deviation of the SNRs calculated by the receiver from at least one of a combined channel gain or a spatial channel gain([0163], [0180]-[0187]).

Re Claim 4, the combined teachings disclose the adaptive transmitter of claim 1, Walton further teaches wherein the modulation and encoding method and transmit power determining unit comprises:

a per-modulation-encoding-method target mean received SNR table for presetting target mean SNR per modulation encoding method ([0076]);

a transmit power increase table for setting per-modulation-encoding-method compensated power values corresponding to the normalized standard deviation of the SNRs fed back from the receiver ([0093]);

a transmit power determining unit (controller **230**, Figure 2A) for using the target power output from the per-modulation-encoding-method target mean received SNR table, the compensated power value according to the mean of the SNRs fed back from the receiver, and the compensated power value output by the transmit power increase table according to the normalized standard deviation of the fed-back SNRs, and determining the compensated power values on the corresponding antenna method and the modulation and encoding method ([0105], [0180]-[0187]); and

an antenna/modulation/encoding method determining unit for determining the antenna method and the modulation and encoding method which correspond to the compensated power values determined by the transmit power determining unit, and outputting them to the encoder and modulator (Figure 3B, [0104]).

Re Claim 5, the combined teachings disclose the adaptive transmitter of claim 3, Walton further teaches wherein the received log likelihood ratio parameters include the mean and the normalized standard deviation of the combined SNRs calculated by the receiver in the case of using diversity transmission ([0165]),

the parameters include the mean and the normalized standard deviation of the spatial channel SNRs calculated by the receiver in the case of using spatial multiplexing transmission ([0157]), and

the parameters include the mean and the normalized standard deviation of the combined SNRs calculated by the receiver ([0152]), and a mean and a normalized standard deviation of the spatial channel SNRs calculated by the receiver in the case of using both diversity transmission and spatial multiplexing transmission ([0116], [0174], [0195]).

Re Claim 6, Walton discloses an adaptive receiver in a wireless communication system using frequency division duplexing (Background, [0004]), comprising:

a demodulator and decoder for receiving signals from a transmitter, and demodulating and decoding the signals (Receiver **106a**, Figure 2B);

an SNR (i.e., signal to noise ratio) measuring unit for estimating channel gains or an SNRs in a single code block through preambles or pilots output by the demodulator and decoder ([0011], [0177]); and

a received log likelihood ratio parameter determining unit for finding parameters from the channel gains or the SNRs estimated by the SNR measuring unit ([0012]), and feeding the parameters back for adaptive transmission of the transmitter ([0152], [0211], a receiver processes received signal and provides channel state information then transmits the feedback signal to the transmitter [0080], [0148], SNR of the transmission

and noise variance (standard deviation is equal to square root of variance) [0180]-[0187]), and deriving and reporting full or partial CSI [0302])-[0538]).

Walton discloses the claimed invention except explicitly teaches wherein the parameters including a mean and a normalized standard deviation of the SNRS in the single code block.

However, Kong teaches a channel transmission device wherein the parameters including a mean and a normalized standard deviation of the SNRS in the single code block ([0150]-[0154]). Therefore, it would have been obvious to one skilled in the arts at the time the invention was made to utilize the transmit power determination as taught by Kong with the adaptive transmitter as taught by Walton to achieve the same expected result and to further improve the signal transmission quality.

Re Claim 7, the combined teachings disclose the adaptive receiver of claim 6, Walton further teaches wherein the received log likelihood ratio parameter determining unit comprises:

a diversity received log likelihood ratio parameter determining unit (Figure 4A-G) for calculating combined SNRs from the channel gains or the SNRs estimated by the SNR measuring unit ([0195]), determining a diversity received log likelihood ratio parameters ([0213]), and outputting the parameters to the transmitter ([0011]); and

a spatial multiplexing received log likelihood ratio parameter determining unit for calculating SNRs of spatial channels from the channel gains or the SNRs estimated by the SNR measuring unit ([0069]), determining a spatial multiplexing received log

likelihood ratio parameters, and outputting the parameters to the transmitter ([0172], [0211]).

Re Claim 8, the combined teachings disclose the adaptive receiver of claim 7, Walton further teaches wherein the diversity received log likelihood ratio parameter determining unit ([0165]) comprises:

a combined channel gain calculator (spatial/space-time processor **410c**, Figure 4C) for receiving per-transmit/receive-antenna channel gain or SNR for each symbol in a single code block from the SNR measuring unit, and finding the combined channel gain and the combined SNR of each symbol in the code block ([0208]-[0212]); and

a mean and normalized standard deviation calculator (adaptive processor **428**, Figure 4C) for finding a mean and a normalized standard deviation of the combined SNRs in the single code block obtained from the combined channel gain calculator, setting them as the diversity received log likelihood ratio parameters, and feeding the parameters back to the transmitter ([0195]).

Re Claim 9, the combined teachings disclose the adaptive receiver of claim 7, Walton further teaches wherein the spatial multiplexing received log likelihood ratio parameter determining unit ([0069]) comprises:

a spatial channel gain calculator (spatial/space-time processor **410b**, Figure 4B) for receiving a channel gain matrix of each symbol in the single code block from the

SNR measuring unit, and finding singular values of the matrix or the SNR of the respective spatial channels ([0173]-[0185]); and

a mean and normalized standard deviation calculator (channel estimator **418**, Figure 4B) for finding the mean and the normalized standard deviation of the spatial channel gain or the spatial channel SNR in the single code block found from the spatial channel gain calculator, setting them as the spatial multiplexing received log likelihood ratio parameters, and feeding the parameters back to the transmitter ([0172], [0188]-[0194]).

Re Claim 10, Walton discloses an adaptive transmitting method of a wireless communication system using frequency division duplexing (Background, [0004]), comprising:

(a) transmitting a pilot or a preamble to a receiver by using a predefined transmit power ([0092], [0098]);

(b) determining an antenna method, a modulation and encoding method, and a transmit power based on the parameters (received log likelihood ratio parameters) fed back from a receiver, the parameters including a mean and a normalized standard deviation of SNRs calculated by the receiver ([0093], [0100] a receiver processes received signal and provides channel state information then transmits the feedback signal to the transmitter [0080], [0148], SNR of the transmission and noise variance (standard deviation is equal to square root of variance) [0180]-[0187]), and deriving and reporting full or partial CSI [0302])-[0538]); and

(c) transmitting traffic data to the receiver by using the determined antenna method, the modulation and encoding method, and the transmit power ([0011]).

Walton discloses the claimed invention except explicitly teaches wherein the transmit power is determined based on a transmit power determined according to the mean of the SNRs and an increasing transmit power determined according to the normalized standard deviation of the SNRs.

However, Kong teaches a channel transmission device wherein the parameters including a mean and a normalized standard deviation of the SNRS in the single code block ([0150]-[0154]). Therefore, it would have been obvious to one skilled in the arts at the time the invention was made to utilize the transmit power determination as taught by Kong with the adaptive transmitter as taught by Walton to achieve the same expected result and to further improve the signal transmission quality.

Re Claim 11, the combined teachings disclose the adaptive transmitting method of claim 10, Walton further teaches wherein (b) comprises presetting and storing the performance of all the antenna/modulation/encoding methods used by an adaptive transmitter with respect to the pre-determined quantized values of the received log likelihood ratio parameters (Figure 2B, [0550]), and calculating transmit power needed for obtaining target performance on each antenna/modulation/encoding method from the received log likelihood ratio parameters fed back from the receiver (controller **230**, scheduler **234**, Figure 2B, [0081]-[0083]).

Re Claim 12, the combined teachings disclose the adaptive transmitting method of claim 10, Walton further teaches wherein (b) comprises finding a transmit power needed for further compensating for the mean of received SNR for achieving target performance on the predefined antenna methods and the modulation and encoding methods (Figure 3B, [0105]), and a compensated transmit power for achieving target performance on the predefined antenna methods and the modulation and encoding methods from the received log likelihood ratio parameters fed back from the receiver ([0106]-[0113]).

Re Claim 13, the combined teachings disclose the adaptive transmitting method of claim 10, Walton further teaches wherein (b) comprises:

compensating for a difference between the mean of received SNR for achieving target performance on the predefined antenna methods and the modulation and encoding methods and the mean of the received SNR fed back from the receiver ([0082]); and

finding a transmit power so as to compensate for a compensated transmit power further needed for achieving target performance on the predefined antenna methods and the modulation and encoding methods from the normalized standard deviation of the SNRs fed back from the receiver ([0085]).

Re Claim 14, Walton discloses an adaptive receiving method of a wireless communication system using frequency division duplexing, comprising:

(a) estimating a complex channel gain (the complex channel gain being from a transmit antenna to a receive antenna) of each symbol in a single code block through a pilot or a preamble transmitted from a transmitter ([0097]);

(b) calculating parameters (received log likelihood ratio parameters) including a mean of SNRs from the estimated complex channel gain (from a transmit antenna to a receive antenna) of each symbol in a single code block ([0165], [0195], [0213], a receiver processes received signal and provides channel state information then transmits the feedback signal to the transmitter [0080], [0148], SNR of the transmission and noise variance (standard deviation is equal to square root of variance) [0180]-[0187]), and deriving and reporting full or partial CSI [0302])-[0538]); and

(c) feeding the calculated received log likelihood ratio parameters to the transmitter for adaptive transmission in the transmitter ([0153]).

Walton discloses the claimed invention except explicitly teaches wherein calculating parameters including a mean and a normalized standard deviation of SNRs from the estimated complex channel gain.

However, Kong teaches a channel transmission device wherein the parameters including a mean and a normalized standard deviation of the SNRS in the single code block ([0150]-[0154]). Therefore, it would have been obvious to one skilled in the arts at the time the invention was made to utilize the transmit power determination as taught by Kong with the adaptive transmitter as taught by Walton to achieve the same expected result and to further improve the signal transmission quality.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH LAM whose telephone number is (571)270-1862. The examiner can normally be reached on Mon - Thu 7:30 am - 5:00 pm EST ALT Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KENNETH LAM/
Examiner, Art Unit 2611
09/01/2008
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611